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ABSTRACT

A minicourse that uses a problem-solving approach to teach physical therapy skills was developed for the Physical Therapy Program at California State University, Fresno. Clinical supervisors and faculty helped to identify competencies and write behavioral objectives, and physical therapy students provided input to help design the minicourse. An extensive literature search determined approaches used by other allied health programs to incorporate problem-solving into the curriculum. Once written, the terminal objective and enabling objectives became the basis around which the remainder of the course evolved. The minicourse was designed to be taught over two Saturdays, or 15 hours. The target audience was junior and senior physical therapy students, plus clinical supervisors. The completed minicourse has been approved by department faculty, clinical supervisors, and students. Feedback from participants should be obtained at the conclusion of the course to help faculty determine how to implement problem-solving within the overall curriculum. Appendices provide: course objectives; course outline with time schedule; minicourse subject topics; objectives for specific topics (e.g., anatomy and kinesiology); and teaching strategies for each topic, including possible media, learner activity, and teacher activity. (Author/SW)

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DEVELOPING A PROBLEM-SOLVING APPROACH TO TEACHING PHYSICAL THERAPY SKILLS

CURRICULUM DEVELOPMENT

by

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ABSTRACT

In 1978 the accreditation team of the American Physical Therapy Association made an on-site visit to the Physical Therapy Program at California State University, Fresno. A deficit was found in the area of "development of problem-solving skills by the students." The accreditation team suggested that the faculty of the Physical Therapy Program review the entire curriculum and make revisions to reflect higher levels of learning. Before making extensive curricular changes the faculty decided to practice teaching utilizing a problem-solving approach in a limited subject, as in a mini-course. The purpose of this practicum was to develop a mini-course that would utilize a problem-solving approach to teaching a physical therapy skill.

An extensive literature search was done to define concepts such as problem-solving and competencies, and also to determine how other programs of allied health had incorporated problem-solving into their curriculum. Clinical supervisors from Fresno were selected to provide input into development of the mini-course. Faculty meetings were held to augment faculty knowledge of problem-solving techniques, writing behavioral objectives and identifying competencies. Students currently enrolled in the Physical Therapy Program were asked to give input into the design of the mini-course. The course was developed utilizing suggestions from the above three sources.

Once written, the terminal objective and enabling objectives became the basis around which the rest of the course evolved. The mini-course has been designed to be taught over two Saturdays, or

fifteen hours. The target audience selected has been junior and senior physical therapy students, plus clinical supervisors.

The completed mini-course has been approved by the faculty of the Physical Therapy Program, participating clinical supervisors, and physical therapy students. It is recommended that the faculty of the Physical Therapy Program implement the mini-course as planned. It is also recommended that feedback from the participants be obtained from a critique at the conclusion of the course. This information may be used by the faculty in the determination of how to implement problem-solving within the overall curriculum.

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INTRODUCTION

Public education is an institution that is often taken for granted in the United States. The right of every citizen to an education is seldom questioned. However, the purposes or outcome of education is a subject sure to spark debate in almost any group of educators, where apparently two main philosophies thrive. One is the philosophy that students should be taught the basics, or along subject-centered lines. The other philosophy is that students should be taught the ability to think, or problem solve, the ability to "deal with the practical problems of life from a consistent set of values" (Robinson, 1978:5).

A perusal of literature related to curriculum design in higher education reveals that throughout the history of education curriculum has been developed mainly along subject-centered courses. That is, once the areas have been identified in which an educated person should have expertise, a knowledgeable person or authority in a particular subject area has been selected to teach that specific course. This has resulted in little integration of subject matter and in students who have learned to memorize facts for tests, but who may see little correlation between their school work and their world outside of school (Robinson, 1978). That there is a correlation is questionable, as reported by Hoyt (1965:1-58) who finds no strong correlations between school grades and success in nontechnical jobs, medicine, social status, citizenship activities or cultural interest.

A strong argument for teaching students to problem-solve is stated well by Combs, who feels that our society appears to be in the midst of an information explosion from which we "can never again hope to design a curriculum to be required of everyone" (1981:370). Following that logic, educational institutions could best serve society by producing students who are adaptable, self-directed, and have problem-solving skills which will be useful beyond graduation to help them deal effectively with their environment. Teaching problem-solving skills goes beyond teaching students to memorize facts in single subject courses and thus requires an integration of courses with close communication between faculty members. Most educators will agree that much of the information which they taught only a few years ago is out of date now, or has been superseded by new techniques. In light of this, it would serve today's students well to learn problem-solving approaches which will create effective solutions in an ever-changing world.

That problem-solving skills of some sort should be included in the higher education curricula is becoming more accepted and may be expected by some accrediting agencies. The accreditation team of the American Physical Therapy Association recently visited the Program of Physical Therapy at California State University, Fresno. A deficit was found in the area of "development of problem-solving skills by the students," whereupon the accreditation team suggested that the faculty of the Physical Therapy Program review the entire curriculum to "revise and update program goals and course objectives to reflect higher levels of learning."

During the academic year 1979-1980 the Physical Therapy faculty met with clinical supervisors in Fresno to review the Physical Therapy curriculum at California State University, Fresno and draw up plans for revisions. The decision was made to develop a problem-solving competency-based curriculum, within the resources available to the program. Hesitance was met when large overall changes were suggested and finally a plan was agreed upon to limit changes to the updating of courses while studying what other physical therapy and health-care academic programs are doing with their curricula. Meanwhile, a mini-course could be developed to give the faculty a chance to practice teaching utilizing a problem-solving approach. This mini-course could be taught as an elective class in the fall of 1981, encompassing two Saturdays. Results of the mini-course could then be used in planning further curriculum revisions. Ths purpose of this practicum was to develop that mini-course.

BACKGROUND AND SIGNIFICANCE

The suggestion by the accreditation team of the American Physical Therapy Association that the faculty update the curriculum in the Program of Physical Therapy at California State University, Fresno and include "development of problem-solving skills by the students" was not an idle comment. The Program of Physical Therapy was placed on a one-year probation during which time the faculty consulted with clinical supervisors and drew up preliminary plans for curricular changes. At the end of the year, full accreditation was granted; however, the accreditation team made it clear that they plan another on-site visit within two years to determine what changes have actually been made.

Faculty response to the situation was initially one of elation that few deficits were noted in the curriculum. In fact, with the recent adoption of new Standards of Education by the American Physical Therapy Association, most physical therapy programs are only now changing their teaching methods. The traditional, subject-centered approach, focusing on subject, or content, but excluding the process, or modes of inquiry and learning has been the teaching method used in most Physical Therapy programs (Barr, 1977). Worthingham's studies of 1961 and 1965 graduates from physical therapy programs indicate that lack of correlation between academic theory and clinical practice was the biggest complaint, or difficulty, confronting new therapists (1969). The problem will continue to be perpetuated today in academic programs whose curriculum reflects the traditional approach to teaching; that is, where subject areas are clearly separated and taught as discreet courses. Full-time clinical experiences do not usually occur until completion of scholastic work. Apparently faculty expectations have been that soon after graduation, the new physical therapists will learn to correlate previously learned academic material with new clinical experiences, and thus develop the skills necessary to evaluate and treat any patient referred to a physical therapy clinic. This process has been termed, by many experienced therapists, as "learning the art" of physical therapy.

Knowing that they were not alone among other schools of physical therapy in teaching a subject-centered approach offered little solace to the faculty of the Physical Therapy Program at California State University, Fresno. To obtain full accreditation

the curricula had to be changed. Faculty members expressed uncertainty as to exactly what was meant by problem-solving, competency-based curriculum, and how the changes would affect the faculty members, both individually and as a group. Therefore, before a mini-course could be developed, answers to the above questions had to be found.

A search of the literature was undertaken to determine various approaches that have been utilized in allied health programs and other specialty areas in reference to problem-solving, competency-based methods of instruction. Several definitions of problem-solving can be found in the literature. Mayer (1977) feels that the terms thinking, cognition, and problem-solving are interchangeable. Combs (1981:370) sees problem-solving as "using your brain and all the resources you can command to search for solutions." Others, such as Thomas (1977) or Gagne (1979), see problem-solving as being a cognitive style variant, or cognitive strategy which can be taught to a certain extent but may be limited by intelligence. May (1980:1140) gives a more comprehensive perspective by defining problem-solving as an "internal and sequential process that includes cognitive, affective, and psychomotor behaviors." All agree that teaching problem-solving techniques involves much more than having students memorize facts and figures. Granted, a base knowledge of facts, or knowledge of reference sources, is essential. Beyond that, the student must be exposed to systems, or thought processes which help him identify problems and arrive at workable solutions. Problem-solving skills would fit into the categories of synthesis and evaluation in the Cognitive Domain of the Taxonomy of Educational Objectives developed by Bloom (1956). In order to perform

synthesis and evaluation, the student must have a recall of facts, an understanding of the material, an ability to apply the facts to new situations, and an ability to analyze or break down new material into its component parts.

Suggestions and steps in teaching problem-solving vary. Getzels (1975) provides a simple way of defining the types of problems that students can learn to solve. Type case 1 is where the student is given a problem and knows the method to obtain a solution. Type case 2 is where the student is given only the problem, and Type case 3 is where the student must discover the problem, the method, and the solution. Getzels feels that Type case 3 is the same as inventive problem-solving, but is rarely the focus of instruction in higher education.

Authors disagree as to the number of steps involved in solving a problem. Thomas (1977) gives a six-step phase of problem-solving and quotes educator Dewey as giving a five-step phase, while May (1980) defines a seven-step process. All would probably agree with the following steps:

1. Problem identification (recognition and definition)
2. Analysis of problem (breakdown into its parts)
3. Collection of data
4. Solution development and selection
5. Solution implementation
6. Evaluation of outcome

To inspire students to synthesize unique solutions to problems rather than merely try to guess what the teacher would say, Thomas (1977) suggests brainstorming in small groups where criticism is withheld until all possible solutions (real and fantasy) have been collected. Other suggestions might be the use of fantasy analogies, wish statements, or free association. Only after the students have exhausted their ideas

would the group look over the suggestions in a judgmental manner.

In the allied health field, problem-solving techniques are being used in some areas of curriculum development. Because of the program demands, there is usually not enough time to add a separate course in problem-solving. Instead, the profession is looked at broadly enough to identify terminal objectives, or skills in which the student must be proficient upon graduation. These skills are called competencies. Broski (1977:39) further defines competencies as "identified and assessable behaviors reflective of prerequisite professional knowledge, performance skills, therapeutic applications, and attitudes." A task analysis of each competency, or skill, is performed to identify sub-skills. The sub-skills are then grouped into similar categories. Each category is taught in a module, so as to interrelate information presented, rather than to teach separate subject areas. Specific objectives are formulated for each module. The consensus of opinion seems to be that as students learn small parts of each task, they can eventually build a basis of knowledge and concepts that lead to higher order learning and performance skills. The ability to perform the terminal objectives, or competencies, implies ability to problem-solve in that profession. The relationship can be more direct if, for instance, one of the terminal objectives were stated "student will identify problems encountered by the patient who has arthritis and synthesize appropriate medical solutions." If the sub-tasks have been correctly sequenced into the curriculum the student will be learning a problem-solving approach as he progresses through the modules. "A competency-based curriculum is a purposefully provided vehicle for

ensuring that learners possess predetermined professional attitudes" (Broski, 1977:39).

In a competency-based curriculum, "subject matter concepts related to a particular program objective are presented in an integrated manner as students systematically acquire the skills they are expected to exhibit" (May, 1979:168). Students must demonstrate their mastery of competencies by passing a criterion-referenced examination, or an exam which is cross referenced to each objective, before they can proceed to the next unit. The level of proficiency, or score which must be obtained to achieve mastery of each module is predetermined by the faculty. Thus, if seventy-five percent accuracy is considered the mastery level, the student must obtain seventy-five percent or better, regardless of the scores other students may have achieved, as in a norm-referenced test (May, 1977). McGaghie (1978) reports on a similar competency-based curriculum for medical education at Case Western Reserve in 1950. The curriculum has become a model for other medical schools.

Once health students are in a clinical situation and away from the academic environment, they must be able to perform problem-solving tasks related to direct patient care. Day (1973) has developed a systematic problem-solving model to aid students in treatment planning. After observing an evaluation of a patient, or actually performing the evaluation, the student must identify the medical problems of that patient. For each problem, the student lists the probable cause, a treatment technique and rationale for the treatment, along with a treatment goal.

The literature search provided a rich source of information with which to educate the Physical Therapy Faculty at California State University, Fresno on the concepts of problem-solving, competency-based education. Several articles were found describing the implementation of these principles in curricula in physical therapy and other allied health fields. This information was used in developing the mini-course.

PROCEDURES

Once a literature search was done, a determination could be made of what other allied health or physical therapy programs were doing with their curricula to convert to a problem-solving approach. Part of development of the mini-course involved educating the faculty and defining such terms as objectives, competencies and problem-solving. This information was shared with faculty of the Physical Therapy Program at California State University, Fresno during regularly scheduled faculty meetings. A list of articles which had been published in the Journal of the American Physical Therapy Association and which dealt with problem-solving in curricula was distributed to each of the faculty (Appendix F). Faculty members were encouraged to read these articles because the faculty had ready access to the above-mentioned professional journal.

At a subsequent faculty meeting the problem-solving approach was reviewed and the formation of the mini-course was discussed. A suggestion for the terminal, or overall, course objective was presented and received faculty approval with minor editorial changes. A patient

diagnosis was agreed upon, so that the terminal objective read "Participant will, upon completion of this course, demonstrate the ability to use a problem-solving approach to evaluation of a patient diagnosed as post surgical menisectomy. Participant will identify patient problems, develop appropriate goals, treatment plans, and make referrals to other health professionals when indicated."

The decision as to which clinical supervisors to approach for input into the formation of the mini-course was expedited somewhat by considering which clinical supervisors were active in the Clinical Supervisors Committee of Fresno. Originally formulated as an advisory curriculum committee for the Physical Therapy Program in 1978, it expanded its scope to become the Clinical Supervisors Committee of Fresno. The committee consists of one clinical supervisor from each of the Fresno clinics affiliated with the Physical Therapy Program plus two faculty from the Physical Therapy Program, for a total of ten members. The main purpose of the committee has been to insure contiguity between objectives of the Physical Therapy Program and objectives of affiliating clinical departments.

Members of the Clinical Supervisors committee are familiar with use of the problem-solving model developed by Day (1973) and have been applying it with students from the Physical Therapy Program at California State University, Fresno. The idea of competencies was not new to committee members. Using the handbook Competencies in Physical Therapy: An Analysis of Practice, plus evaluation tools developed by other Physical Therapy Programs, the committee published its Performance Appraisal System in Physical Therapy Clinical Education in 1981. This

appraisal tool is currently in statewide use by clinical affiliates of the Physical Therapy Program at California State University, Fresno.

Considering the aforesaid information, an appointment was made with the chairperson of the Clinical Educators Committee of Fresno to obtain a slot on the agenda of the next meeting. Membership on the Committee had changed somewhat since its inception, so the first meeting consisted of a review of definitions of problem-solving and competencies. Committee members were informed of the formation of a mini-course and asked to come up with ideas at the next meeting. The same bibliography which had been given to faculty members was distributed to committee members (Appendix F).

At the following meeting, two topics were discussed at length. Clinicians felt that the diagnosis decided upon by the faculty of the Physical Therapy Program was too broad and could not be taught as a terminal objective in fifteen hours. They suggested limiting the diagnosis to "post arthroscopic menisectomy," which is a simpler procedure and has fewer post surgical complications. To further avoid confusion, they suggested that the condition of the patient be that of an active middle aged athlete with no prior medical problems. The second topic discussed was whether or not to limit the mini-course to only one terminal objective.

The handbook Competencies in Physical Therapy: An Analysis of Practice identifies seven major areas of responsibility in which physical therapists could be competence. May (1977) identifies five areas in which a graduate physical therapist should be able to problem solve. Chidley (1979) identifies seven functions which an entry level physical

therapist should be able to perform. Members of the Clinical Supervisors Committee of Fresno felt that the three authors were speaking of the same things, but categorized them differently. Unanimously the committee members agreed that the mini-course emphasis should focus upon direct patient care, to the exclusion of educational services, research, administrative services, quality assurance programs, or professional activities. Thus, the terminal objective, as decided upon by the faculty of the Physical Therapy Program, was approved, with the suggestion to change the diagnosis to post arthroscopic menisectomy.

At the next faculty meeting, faculty members agreed upon the change in diagnosis. The next task involved further detailing of the terminal, or course objective, to clarify its intention for all the faculty. To this end, seven enabling objectives were formulated (Appendix A).

When the enabling objectives had been written, subject topics had to be decided upon which would include information necessary to assist students in learning the objectives. In deciding upon topics and related information within each subject area the articles written by Chidley (1979), Barr (1977), and May (1977) were used as guides. The completed subjects topics list (Appendix C) was approved by both the Clinical Supervisors Committee and the faculty of the Physical Therapy Program without changes.

Mention should be made of the input provided by students in the Physical Therapy Program. Ten students had been involved in the original curriculum committee of 1978. Those students expressed keen interest in developing a problem-solving approach within the Physical Therapy

Program's curriculum. They felt that the subject-centered approach did not adequately integrate academic work with the clinical situation. Those students have since graduated. In 1980 and 1981 class time was set aside within the senior level courses to discuss the curriculum currently in use and brain storm on possible changes. There were thirty-two students each year. Several suggestions were made which were not feasible to budgeting or resources within the Physical Therapy Program or the clinical settings in Fresno. The majority of students consistently suggested or approved the idea of a problem-solving approach. Most were in favor of an approach similar to that presented by May (1977). For a mini-course offering most students felt that a greater proportion of time should be spent upon the basic subjects of anatomy, kinesiology, pathology and therapeutic processes. Information from these subjects could be used to reach the terminal objective, involving evaluation, problem identification, and possible referrals.

Faculty and clinical supervisors agreed with the students as to time distribution of subjects within the mini-course. Faculty agreed that they would each teach their subject specialty area, which meant that a team approach would be used to present the mini-course. A team approach would also assure that each faculty person had an opportunity to practice teaching utilizing a problem-solving approach. The course outline was designed with the above suggestions in mind, and within the time constraints of a one-unit, fifteen-hour mini-course (Appendix B).

Gagne (1979) provided useful guidelines in development of suggested teaching strategies for each subject area. The time limitation would prevent consideration of a wide variety of teaching

strategies, with lecture and demonstration being indicated as the preferred methods by most of the Physical Therapy faculty. Little time would be available for class discussion if all the material were to be presented in fifteen hours. Nevertheless, several strategies were identified (Appendix E).

The faculty worked together to develop specific objectives for each of their presentations. This exercise helped to familiarize the faculty with writing objectives and also prevented replication of objectives among speakers (Appendix D). Once the specific objectives were decided upon, the faculty returned to the subject topics list (Appendix C) for further clarification and to avoid redundancy or omittance of sub-topics. The above procedures required several faculty meetings and planning sessions. Each faculty member developed their own overheads, slides or posters for their presentations.

To obtain the feedback from students at various academic levels and keep the numbers of students at a manageable level, the faculty decided to open the course to ten juniors and ten seniors currently enrolled in the Physical Therapy Program. Flyers were mailed to all of the affiliating clinical facilities in Fresno, inviting clinicians to register for the mini-course, up to a limited number of ten. Thus, thirty participants would be expected to register for the course, to learn and also to provide feedback to the Physical Therapy faculty at the conclusion of the mini-course. Because of the limitation placed upon enrollments, the first ten people to register from each category would be accepted and later registrants would be placed on a waiting list. Feedback would be obtained at the end of the mini-course by

asking participants to fill out a course critique, and to take a post-test. Plans completed, the mini-course was scheduled to be offered during the fall 1981 semester.

RESULTS

The purpose of this project was to develop a mini-course in a physical therapy subject area, utilizing a problem-solving approach. To this end, suggestions were sought and received from students and faculty within the Physical Therapy Program at California State University, Fresno, as well as from clinical supervisors from the Clinical Supervisors Committee of Fresno. At each step in the development of the mini-course, input was received from the above three sources.

The resultant product is a course designed to be team taught over a fifteen-hour period, or two Saturdays. The overall course objective is that the "participant will, upon completion of the course, demonstrate the ability to use a problem-solving approach to evaluation of a patient diagnosed as post arthroscopic menisectomy. Participant will identify patient problems, develop appropriate goals, treatment plans, and referrals to other health professionals." Enabling objectives were identified and appear in Appendix A. Subject topics, based upon the enabling objectives, were decided upon and elaborated in Appendix C. Subject topics were arranged in hierarchal manner in relation to the terminal objective. This order was maintained in the course outline in Appendix B. Faculty members agreed to present subject material that related most closely to their area of expertise, which would result in

a team teaching approach. Team teaching also allowed each faculty member to practice teaching utilizing a problem-solving style. Specific objectives for each faculty presentation were written by the individual faculty members in close consultation with each other, and appear in Appendix D. Suggested teaching strategies for each faculty presentation were developed and appear in Appendix E. The course will be evaluated upon its conclusion by asking participants to complete a course critique and a post-test. The mini-course is planned to be presented on October 17 and November 7, 1981.

DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

The intent of this project was to develop a problem-solving mini-course in a physical therapy subject area which could be taught over a fifteen-hour period, or two Saturdays. To insure that the course adequately covered the subject content and contained current information, selected clinicians were consulted with throughout the course development. Because the faculty would be using a team approach to teaching the mini-course, faculty input was utilized in course development. Junior and senior students currently enrolled in the Physical Therapy Program at California State University, Fresno were encouraged to give suggestions of course content.

Before the project started, an extensive literature survey was undertaken to determine exactly what was meant by problem-solving and how problem-solving is being taught in curriculi at various institutions of higher education across the United States. Specific information on problem-solving techniques utilized within allied health

curriculi was also obtained. The above information was shared with faculty, clinicians and students in a series of inservice presentations and meetings. Definitions of problem-solving were discussed and examples were given of how competencies can be arranged in hierarchal order and then used to build problem-solving skills at successively complex levels.

An unexpected benefit of these meetings was that this knowledge was later used by the clinical supervisors to update the handbook Performance Appraisal System in Physical Therapy Clinical Education, as designed by the Clinical Supervisors Committee of Fresno. Another benefit, as expressed by the students of the Physical Therapy Program, was that they came to feel more involved in their curriculum and learned to use problem-solving skills in their clinical experiences. Perhaps more importantly, communication among faculty members improved as they began to work together to detail exactly what each person would teach so as not to duplicate material, but to build skills, or competencies, upon previously taught information.

It appeared that perhaps for the first time, faculty members became clear as to what was meant by a competency. It also became apparent that many faculty members did not understand what an instructional objective was, how to write one so as to identify higher levels of learning outcomes, how it differed from a teacher-centered objective, or how to utilize instructional objectives when preparing an exam. Although five of the six faculty members in the Physical Therapy Program at California State University, Fresno have masters degrees, only one has a masters degree in education. Therefore, it was understandable that

confusion existed as to the meaning of competencies, objectives, or problem-solving.

When a meeting date was set for a presentation on how to write objectives, faculty members were uneasy. Although they did attend the meeting, some reported that they had to leave early because of prior commitments. As the meeting progressed and faculty became involved in discussion and the writing of objectives they could use for their presentations, the reluctance appeared to diminish. Perhaps, as Rogers (1962) states, "member acceptance of a collective innovation decision is positively related to the degree of participation of members."

Communication channels opened further as faculty members met to discuss the Subject Topics (Appendix C) and detail exactly what each person would teach. As one faculty person expressed, "I was never quite sure what the rest of you were teaching in your classes. We should be meeting like this for all our classes, not just the mini-course."

The completed mini-course has been scheduled to be taught over two Saturdays, one in October and one in November 1981. To obtain feedback from participants at various physical therapy skill levels, the course has been opened to ten junior and ten senior students in the Physical Therapy Program and to ten clinical supervisors from the Clinical Supervisors Committee of Fresno. Space will be available on a first come, first serve basis for the three categories of participants. One unit of credit will be offered from the Saturday School Program at California State University, Fresno.

The implications from the development of the mini-course and the actual applications are impressive. The Physical Therapy faculty are now aware of and using such terms as behavioral objectives, competencies and problem-solving. The new lines of communication which have opened among faculty members have already produced suggestions for how the problem-solving approach could be implemented on a large scale if making overall curriculum changes. The ability to write behavioral objectives within individual courses and the use of problem-solving within the curriculum will bring the Physical Therapy Program closer to meeting the demands of the accreditation team. The clinical supervisors are now updated on changes which the Physical Therapy Program may be undergoing, and have the vocabulary and understanding to make valuable suggestions. Current students in the Physical Therapy Program have a knowledge of problem-solving skills and will be a valuable resource when planning for the curriculum changes.

The mini-course does have some drawbacks, the main one being lack of time. If a problem-solving approach were to be utilized throughout the Physical Therapy Program curriculum, a series of introductory classes would have to be held to explain the basics of each subject area, as explained by May (1977). Then as various diagnoses or pathologies were presented within the curriculum sequence, students would have a base of knowledge, or facts, upon which to build understanding and application of higher order skills. In presenting a fifteen-hour mini-course as exemplary of a whole curriculum, one can assume very little prior knowledge on the part of the students. The lecturers must begin with basic facts and build upon those. This is

both time consuming and limiting in a course which consists of only fifteen hours. Critiques or feedback from students who attend the mini-course must be viewed with the above in mind.

Recommendations for use of the mini-course are that the faculty should now work together to develop a detailed critique for the students and clinical supervisors who will attend the course. A post-test with two or three questions from each subject area presented will also be developed. Again, the time constraints will prevent testing in depth, but learner responses will indicate whether the material was getting across to the students. It would serve the Physical Therapy faculty well once the mini-course has been taught to review and critique the entire course themselves, both objectively and subjectively.

Following presentation of the mini-course the faculty will have to decide whether or not they prefer changing the entire curriculum to a problem-solving approach. To change entirely to a problem-solving approach, subject topics may have to be taught in a series of units or modules, meaning courses may extend beyond the fifteen-week semester. The faculty will have to consult with administration to determine whether the semester system employed at California State University, Fresno is flexible enough to allow for exceptions.

Each faculty member must decide whether they wish to expend the extra time and energy which would initially be necessary to develop and implement a problem-solving approach into the curriculum. They must also consider the strengths, weaknesses and willingness to work as a team of each faculty member in the Physical Therapy Program. The stability of the faculty membership should be weighed. As faculty

membership changes, the process of curriculum revisions would be delayed until the new faculty members became oriented. It might be necessary to educate future faculty persons to such terms as objectives, competencies and problem-solving. All this would demand more time and delays.

Thus, the decision as to whether to implement the problem-solving approach into the curriculum and to what degree may not be made for a long time. That use of such an approach would begin to meet accreditation standards is unquestioned. Whatever the final decision, the first step is a trial of the problem-solving approach, as will be done when the mini-course is actuated in the fall 1981 semester.

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APPENDIX A

OVERALL COURSE OBJECTIVE

Participant will, upon completion of this course, demonstrate the ability to use a problem-solving approach to evaluation of a patient diagnosed as post arthroscopic menisectomy. Participant will identify patient problems, develop appropriate goals, treatment plans, and referrals to other health professionals.

ENABLING OBJECTIVES

In performing the terminal objective, student will utilize her knowledge of the following:

1. Normal knee structures and function
2. Pathological processes and conditions, including the response of tissue to injury and the healing process
3. Orthopedic approaches to patient diagnosis, common conservative and surgical methods currently in use
4. Physiology
5. Physical therapy procedures and modalities, their effects, indications and contraindications
6. Evaluative techniques commonly utilized by a physical therapist, indications and correct application
7. Psychology of illness, patient's physical and emotional needs, and activities/roles of other health care professionals.

APPENDIX B

A PROBLEM-SOLVING APPROACH TO PHYSICAL THERAPY SKILLS

Course Outline

Saturday, October 17, 1981

8:00 - 8:20 A.M.	Registration
8:20 - 8:45 A.M.	Introduction, course objectives (S. Dunkle)
8:45 - 10:45 A.M.	Anatomy and Kinesiology of the Knee (H. James)
10:45 - 11:00 A.M.	Break
11:00 - 12:30 A.M.	Anatomy and Kinesiology of the Knee (continued)
12:30 - 1:30 P.M.	LUNCH
1:30 - 3:00 P.M.	Pathophysiology (J. Prandini)
3:00 - 3:15 P.M.	Break
3:15 - 5:00 P.M.	Pathophysiology (continued)

Sunday, November 7, 1981

8:00 - 9:30 A.M.	Orthopedics (J. Prandini)
9:30 - 9:45 A.M.	Break
9:45 - 11:15 A.M.	Physical Therapy Evaluation, Problem Identification, and Goal Setting (S. Dunkle)
11:15 - 12:15 P.M.	Therapeutic Processes (L. Kehmeier)
12:15 - 1:15 P.M.	LUNCH
1:15 - 3:15 P.M.	Therapeutic Processes (continued)
3:15 - 3:30 P.M.	Break
3:30 - 4:30 P.M.	Medical and Allied Health (D. Stewart)
4:30 - 5:00 P.M.	Exam and Course Critique

APPENDIX C

SUBJECT TOPICS FOR MINI-COURSE

I. Anatomy and Kinesiology of the Lower Extremity with Emphasis on the Knee
   - A. Anatomy
     1. Bones of the knee joint
     2. Muscles acting upon the knee joint
     3. Nerve supply to knee joint structures
     4. Blood supply to the knee joint (intra- and extra-articular)
     5. Periarticular structures of the knee joint (gross)
   - B. Bones of the Knee
     1. Distal end of femur
     2. Proximal tibia
     3. Proximal fibula
     4. Patella
   - C. Muscles of the Knee
     1. Attachments of flexors, rotators, extensors
     2. Hamstrings, sartorius, gracilis, popliteus, gastrocnemius, plantaris, quadriceps
   - D. Nerve Supply of the Knee
     1. Segmental representation of the muscles (myotomes)
     2. Soft tissue structures (including bursae)
   - E. Blood supply of the Knee
     1. Popliteal artery and its branches
     2. Medial and lateral superior genicular arteries
     3. Medial and lateral inferior genicular arteries
     4. Middle genicular artery
   - F. Periarticular Structures of the Knee
     1. Medial and lateral collateral ligaments
     2. Cruciate ligaments
     3. Medial and lateral meniscus
     4. Joint capsule
     5. Bursae (suprapatellar, prepatellar, infrapatellar)
   - G. Kinesiology of the Knee
     1. Range of motion and the line of evolute (including screw home mechanism)
     2. Muscle action about the knee joint (including joint play)
     3. Forces about the knee joint that cause injury
     4. The knee in normal gait

SUBJECT TOPICS FOR MINI-COURSE (continued)

II. Pathophysiology
  A. Inflammation and Repair
    1. Inflammatory reactions
      a. neurological
      b. humoral
      c. vascular
      d. cellular
    2. Repair processes
      a. repair by connective tissue scarring
      b. cellular regeneration
        1). hyperplasia
        2). metaplasia
  B. Normal Synovial Joint Structures and Their Reaction to Injury
    1. Synovial membrane
      a. structure
        1). gross
        2). histology
      b. function
      c. reaction to injury
        1). post-traumatic synovitis
        2). chronic synovitis
        3). hemarthrosis
    2. Synovial fluid
      a. composition
      b. function
        1). joint lubrication
        2). nourishment of articular cartilage
      c. reaction to injury
    3. Joint capsule
      a. structure and function (tissue type and its reaction to injury)
        1). gross
        2). histology
      b. reaction to injury
        1). abnormal joint movement
        2). joint effusion
    4. Meniscus
      a. structure
      b. function (general)
      c. reaction to injury
        1). mechanisms of injury
        2). causes of signs and symptoms
        3). repair process

SUBJECT TOPICS FOR MINI-COURSE (continued)

5. Fat pad
   a. structure
   b. function (general)
6. Articular cartilage
   a. structure (zones 1,2,3) and histology
   b. function
   c. reaction to injury
      1). repair
      2). complications involving underlying bone
7. Effects of immobilization and exercise on synovial joint structures

III. Orthopedics
   A. Diagnostic Techniques
      1. History (classical history of injuries)
      2. Clinical evaluation (brief)
      3. X-rays
      4. Arthrogram
      5. Arthroscopic visualization
      6. Joint fluid evaluation
   B. Mechanisms of Meniscus Injury
   C. Common Injuries Associated with Meniscus Injury
      1. Ligamentous and capsular injuries
      2. Fractures
   D. Treatment of Meniscus Injury
      1. Conservative treatment
      2. Surgical treatment
         a. conventional surgical techniques
         b. arthroscopic surgical techniques
   E. Effects of the Different Treatment Approaches on Rehabilitation, Recovery Time and Healing

SUBJECT TOPICS FOR MINI-COURSE (continued)

IV. Physical Therapy Evaluation, Problem Identification, and Goal Setting
- A. Subjective findings
  1. history of injury (date, activity, immediate tissue response)
  2. collection of data base
  3. pain
  4. patient's goals
- B. Objective findings
  1. observation of gait, posture
  2. inspection and palpation
  3. neurological
     a. cutaneous supply
     b. dermatomes
     c. reflexes
     d. myotomes
  4. manual muscle testing
  5. goniometric findings
  6. joint integrity
  7. joint play
- C. Assessment
  1. identification of patient problems and rationale
  2. short term goals
  3. long term goals
  4. plans for re-evaluation
- C. Communications
  1. POMR
  2. referrals
  3. family members

SUBJECT TOPICS FOR MINI-COURSE (continued)

V. Therapeutic Processes
  A. Purposes of Therapeutic Procedures
    1. Relieve pain - modalities and procedures
    2. Increase mobility - modalities and procedures
    3. Increase function - modalities and procedures
  B. Basic Theories of Heat, Cold and Electrical Currents
    1. Physiological Effects - local and general
    2. Indications and contraindications
    3. Modalities (that could be used with given diagnosis)
      a. whirlpool - hot or cold
      b. hot packs
      c. ultrasound
      d. diathermy, microwave
      e. ice
      f. electrical currents
        1). TENS
        2). biofeedback
        3). DC versus AC
  C. Basic Theories of Exercise
    1. Effects upon:
      a. muscle strength
      b. flexibility
      c. joint mobility
    2. Types of exercise and its physiologic effects (force curves, muscle units, etc.)
      a. passive
      b. assistive
      c. resistive
        1). isotonic - PRE, techniques, rationale, NK table, weights
        2). isometric- examples
        3). isokinetic - Cybex, orthotron
        4). relationship of terminal extension versus full extension versus quad sets
    3. Exercise equipment relating to the knee - any not described and home exercise equipment
    4. Exercise program for the knee
      a. home exercise program
      b. graded exercises
      c. balance of function - quads versus hamstrings
      d. progression of exercises and activities
  D. Function
    1. With adaptive equipment - crutches, ace wraps, etc.
    2. Without adaptive equipment
  E. Communications of treatment plans
    1. aides
    2. referrals to other health professionals

SUBJECT TOPICS FOR MINI-COURSE (continued)

VI. Medical and Allied Health
- A. Social Worker, Vocational Rehabilitation and Psychology
  1. Educational background
  2. Role in working with patients
  3. How referrals are received
- B. Panel discussion
  1. psychology of illness or injury
  2. pain
  3. reaction to illness by patient or family
  4. loss of income
  5. community service agencies

APPENDIX D

SPECIFIC OBJECTIVES

I. Anatomy and Kinesiology
   - A. The participant will correctly identify the anatomical characteristics of the bones that compose the knee
   - B. The participant will identify and describe the attachments of the flexor, extensor and rotator muscles of the knee
   - C. The participant will explain and describe the nerve supply to structures of the knee joint
   - D. The participant will describe the arterial blood supply to the knee joint
   - E. The participant will describe the attachments of the ligaments, menisci, bursae and joint capsule of the knee

II. Pathophysiology
   - A. The participant will list the normal synovial joint structures
   - B. The participant will describe the cellular composition of the specialized synovial joint tissues
   - C. The participant will describe the physiological characteristics of normal synovial joint structures, tissues and fluids as related to their specialized cellular composition
   - D. The participant will describe the inflammatory/reparative process as it applies to synovial joint structures and their response to injury, immobilization and exercise
   - E. The participant will describe basic cellular responses to progressive levels of stress as related to synovial joint structures

III. Orthopedics
   - A. The participant will explain diagnostic techniques used by the physician in evaluating knee injuries, possible findings and their significance
   - B. The participant will describe common injuries that are often found in conjunction with meniscus injury
   - C. The participant will compare and contrast the conservative versus the surgical treatment of meniscus injuries, including the advantages or disadvantages of each
   - D. The participant will explain the techniques of arthroscopic surgery and its advantages over traditional surgery
   - E. The participant will compare the effects of different treatment approaches on rehabilitation, recovery time and healing

IV. Physical Therapy Evaluation, Problem Identification, and Goal Setting
   - A. The participant will explain how to obtain necessary information in the collection of a data base and common items found in the history of a patient with meniscus injury

SPECIFIC OBJECTIVES (continued)

B. The participant will explain or identify the principles of neurological testing, manual muscle testing, goniometric measurements and tests for joint integrity
C. The participant will demonstrate correct technique of evaluating the knee
D. When given possible findings from a knee evaluation, the participant will analyze probable causes of the findings in terms of anatomical injuries, forces that caused the injury, tissue response and predicted outcome
E. When given a list of patient problems, student will plan the short term and long term physical therapy goals

V. Therapeutic Processes
A. The participant will identify the therapeutic techniques used by a physical therapist for relieving pain, increasing mobility, and increasing function of a patient with post arthroscopic menisectomy
B. When presented with possible patient problems, the student will correctly select the appropriate modalities or exercises to allieviate the problem and explain why these techniques were chosen
C. The participant, using knowledge of the effects of exercises upon the body, will plan a treatment program for a patient who is post-op arthroscopic menisectomy
D. The participant will explain common gait problems seen in the patient with injury to the meniscus, why these occur, and plan an appropriate gait training program, utilizing assistive devices as appropriate
E. The participant will explain the differences in isotonic, isometric, and isokinetic exercises and how each type of exercise could be effectively incorporated into a progressive rehabilitation program for a patient with a torn meniscus

VI. Medical and Allied Health
A. The participant will correctly identify the educational background of the health team members as presented and the role of each in working with patients
B. The participant will explain how referrals are made to each of the health team members, both in and out of a hospital
C. When presented with a list of possible patient problems, both pre- and post- surgery, the participant will correctly identify when a referral should be made, to which health team member the referral should be made, and how to go about making the referral
D. The participant will briefly explain the common patient reactions to illness, pain or loss of income, changes in family roles as a result of the illness and how the health care team works together to deal with these problems

TEACHING STRATEGIES APPENDIX E

Topic	Possible Media	Learner Activity	Teacher Activity
Anatomy of the Knee	Blackboard	Listening	Lecture
	Teacher	Observing demonstrations	demonstration
	display posters	Identify parts on cadavers	Oral Quizzing
	Prosected cadavers		
	Models of knee		
	Anatomical charts		
	Overheads		
	Slides		
	Handouts	Label handouts	
Kinesiology	Blackboard	listening	Lecture
	display posters		
	prosected cadavers	find parts on cadavers	demonstration
	models of knee	observing	
	overheads of knee		
	slides		
	movie		
	demonstration of movement		demonstration
	teacher	responding	oral quizzing
Physiology	teacher	listening	lecture
	blackboard	observing	
	overheads		
	slides		
	models of bones		
	models of muscle		
	teacher	responding	oral quizzing
	handouts	reading	lecture

TEACHING STRATEGIES

Topic	Possible Media	Learner Activity	Teacher Activity
Pathology	Teacher	Listening	Lecture
	slides		
	blackboard		
	opaque projector		
	overheads		
	handouts	read, fill in handouts	
		responding	Oral quizzing
Medical Science/ Orthopedics	teacher	listening	Lecture
	videocassette	viewing	
	overheads		
	slides		
	demonstration on self	observe	demonstrate
	teacher	responding	oral quizzing
Therapeutic Processes	teacher	listening	lecture
	modalities equipment	observing	demonstration
	teacher or student	observing	demonstration
	slide/tape modules	observing	
	blackboard	listening	
	overheads		
	handouts	read	
	student	practice exercises	advise
	crutches	observe	demonstrate crutches
	teacher		demonstrate gaits
	ace wraps		demonstrate ace wraps

TEACHING STRATEGIES

Topic	Possible Media	Learner Activity	Teacher Activity
Medical and Allied Health	teacher blackboard overheads guest lecturers panel discussions	listening	lecture
		responding	oral quizzing
Physical Therapy Evaluation and Treatment Planning	teacher blackboard	listening	lecture
	student overheads	observing	demonstrate
	other students	practice techniques	advise
	reflex hammers	practice	demonstrate
	sensory testing wheels	practice	demonstrate
		responding	oral quizzing

APPENDIX F

Articles in the Journal of the American Physical Therapy Association which relate to problem solving in curriculum*:

May, B.J. "An Integrated Problem-Solving Curriculum Design in Physical Therapy Education." July 1977. pp 807 - 813.

May, B.J. "Evaluation in a Competency-Based Educational System." January 1977. pp 28 - 33.

Barr, Jean. "A Problem-Solving Curriculum Design in Physical Therapy." March 1977. pp. 262 - 270.

Shepard, Katherine. "Considerations for Curricular Design." December 1977. pp. 1389 - 1393.

Chidley, M.J. and C.B. Kisner. "Systematic Curricular Development in Physical Therapy." April 1979. pp. 409 - 417.

Special section on Physical Therapy Education, "Past, Present, Future." January 1974. PP. 27 - 42.

Johnson, Geneva. "Curriculum Design." April 1974. pp. 383 - 386.

* The articles are listed in the order of their relevance to a problem-solving curriculum.